37

A.D. 1816 . . . . N° 4039.

SPECIFICATION

OF

WILLIAM SHAND.

ARTIFICIAL LEGS AND FEET.

LONDON:
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Artificial Legs and Feet.

SHAND'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, William Shand, of Villiers Street, in the Strand, in the County of Middlesex, Artificial Limb Maker, send greeting.

WHEREAS His most Excellent Majesty King George the Third, by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the First day of June, in the fifty-sixth year of His reign, did, for Himself and His successors, give and grant unto me, the said William Shand, my ex̃ors, adm̃ors, and assigns, His special licence, full power, sole priviledge and authority, that I, the said William Shand, my ex̃ors, adm̃ors, or assigns, and every of them, by myself and themselves, or by my and their deputy or deputies, servants or agents, or such others as I, the said William Shand, my ex̃ors, adm̃ors, and assigns, shall at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, my Invention of "Certain Improvements in the Construction of Artificial Legs and Feet, made of Leather and Wood, acting by a Lever and Spiral Spring," which Invention I believe will be of general benefit and advantage to such persons as have had the misfortune to lose a leg, being particularly adapted for ascending and descending stairs, as well as the usual purposes of walking;

in which Letters Patent there is contained a proviso obliging me, the said William Shand, under my hand and seal, to cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be enrolled in His Majesty's High Court of Chancery within two calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same (relation being thereunto had) may more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said William Shand, do hereby declare that my said Invention of Improvements in the Construction of Artificial Legs and Feet, made of Leather and Wood, acting by a Lever and Spiral Spring, relates particularly to the joint by which the foot and leg are united together, and which, therefore, supplies the place of the natural ankle joint. To this joint I apply a lever and spiral spring to retain the foot in that position which is most favorable and convenient for the person who wears the artificial leg, whilst standing still upon even ground, and bearing parts of the weight of his body equally upon the toe and heel parts of the sole of the artificial foot. But because that in walking, whilst the body is advancing forwards and the weight still resting upon the foot, the bearing is thrown from the heel part of the sole to the toe part thereof, the foot must bend at the ankle joint, the aforesaid spring will admit of this bending at the joint during the time that the weight of the body is resting upon the toe part of the foot, and the said spring will bear the weight of the body with an elasticity resembling as nearly as possible the action of the natural foot when it is moved by the voluntary contraction of the muscles of the heel. But be it observed, that I do not claim the Invention of applying a spring to the ankle joint of an artificial leg, the same having been before done in various ways, but my Invention consists in the particular mode of application of the lever and spring, as explained by the Drawings hereunto annexed, and also the manner of applying a spring to a second joint made across the sole of the foot near the toes. By my new mode of applying a spiral spring to the ankle joint it is wholly contained and concealed within the artificial leg, and is made to act upon the foot by a short lever, and near to the center of motion of the ankle joint, by which means a short motion or small contraction of the spring is sufficient, and in consequence the tread is made more elastic and more nearly resembles the natural action than when the spring is made to act at a greater distance from the centre of motion. My method requires the spring to be made strong, but as it acts near the centre it does not exert a greater force to return the foot to its original position than the springs heretofore used, but it acts with greater elasticity, that is, it returns with more quickness.

The Drawings hereunto annexed are sections taken through the centre of my artificial leg and foot, to shew its interior structure, Figure 1 being taken when the foot is in the position of standing, and the sole of the foot bearing flat on the ground; and Figure 2 is the position when the leg is inclined so as to take up the heel and throw all the bearing on the toe part, in which state the weight will be borne by the springs A and B. The former of these, which is the spiral spring, is made of strong steel wire curled, as shewn by the Drawing, and fitted into an iron tube C, which is let into the solid wood of the leg D, and retained by a projecting flanch E, E, at the upper end. The lower end of the tube has a bottom fitted into it, with a small hole in the centre, through which the round pin F passes, and rising up through the hollow of the curled spring, has a nut G screwed upon it, which nearly fills the tube, but with liberty to slide freely up and down therein; therefore, when the pin F is drawn down its nut must descend into the tube and compress the spring, which, exerting its force to return, draws up the pin. The foot H, I, is jointed in the leg by a mortise or opening cut into the latter at the front side for the reception of a tennant or reduced part H formed on the foot, and a round pin K, which passes through both, is the joint pin or centre of motion. L, N, is the lever, made of iron and firmly fixed to the tennant part of the foot by the screw M, and at N it is jointed to the pin F of the spring, which pin is bent at right angles to reach the joint N, at the same time that the tube is fixed in the centre of the leg (note, this is not essential, for the tube may be fixed immediately over the joint N, and then F may be a straight pin). The joint N is considerably above the centre pin K, and this occasions the action of the spring upon the lever N, L, to be equal to what it would be on a lever much shorter than the distance N, K, if N was on a level with the centre K. The action of the spring, by drawing the joint N upwards, is to retain the foot in the position of Figure 1, where the lower part of the foot comes to rest against a piece of cork O at the heel, placed withinside the mortise in the leg in which the reduced part H of the foot works. This stops the foot in the position of Figure 1, but when the tread is made upon it and the leg inclines forwards, as in Figure 2, the foot moves upon the centre pin K, and the lever N draws down the pin F and nut G and compresses the spring in the tube C, which by its action to return causes that elasticity of the tread of the foot which is desirable. The force of the spring A can be increased or diminished at the pleasure of the person who wears the artificial leg by screwing or unscrewing the nut G, thereby giving to the spring more or less force, until the wearer finds it suitable to his weight, and that it makes his tread easy and similar to that of the natural foot. The upper end of the tube C is left open to the inside of the hollow or trunk at the top of the artificial leg which is to receive the stump of the real leg, so as to give access to the nut G when the stump is withdrawn for the purpose of regulating the spring; at the same time the joint of the toes of the artificial foot also bends. The toe part P of the foot is reduced to a tennant at Q, which is received in a mortise or opening in the foot at I, and a pin R forms the joint. B is the spring, which is applied in a hollow at the under side of the sole of the foot, and is firmly screwed thereto at the other extremity. It bears beneath the end of the tennant or reduced part Q, so as to raise it upwards, and this tends to depress the toe part to the level of the under surface of the foot, in the manner of Figure 1, when the upper surface of Q rests against the solid wood of the foot. The extremity of the spring B has a small roller fitted to it to diminish the friction of the surface of Q sliding against it, and this surface should be plated with iron; or instead of an iron plate another steel spring may be applied beneath the foot, and the roller at the end of the spring B will then bear against the said spring, and in this manner, by applying two springs to act upon each other, the motion is made more easy; but this is not essential to my Invention. The artificial leg and foot may be made of wood or other suitable materials and covered with leather, and it may be adapted and fitted to the stump of the leg with a hollow wood or leather tube to receive the stump, and lined with cushions and fastened on with straps, in the same manner as other artificial legs. These, not being particulars of my Invention, need not be described. Also it may be used in conjunction with a common artificial knee joint, or not, as the circumstance may require.

In witness whereof, I, the said William Shand, have hereunto set my hand and seal, this Twenty-seventh day of July, in the year of our Lord One thousand eight hundred and sixteen.

W^M (L.S.) SHAND.

Signed, sealed, and delivered, by the within-named William Shand, in the presence of

THO^S W. BOLTON,
4, Elm Court, Temple.
JS. T. BOLTON,
Same place.

AND BE IT REMEMBERED, that on the Twenty-seventh day of July, in the year of our Lord 1816, the aforesaid William Shand came before our said Lord the King in His Chancery, and acknowleged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stampt according to the tenor of the Statute made for that purpose.

Inrolled the Twenty-seventh day of July, in the year of our Lord One thousand eight hundred and sixteen.

LONDON:
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(1 SHEET

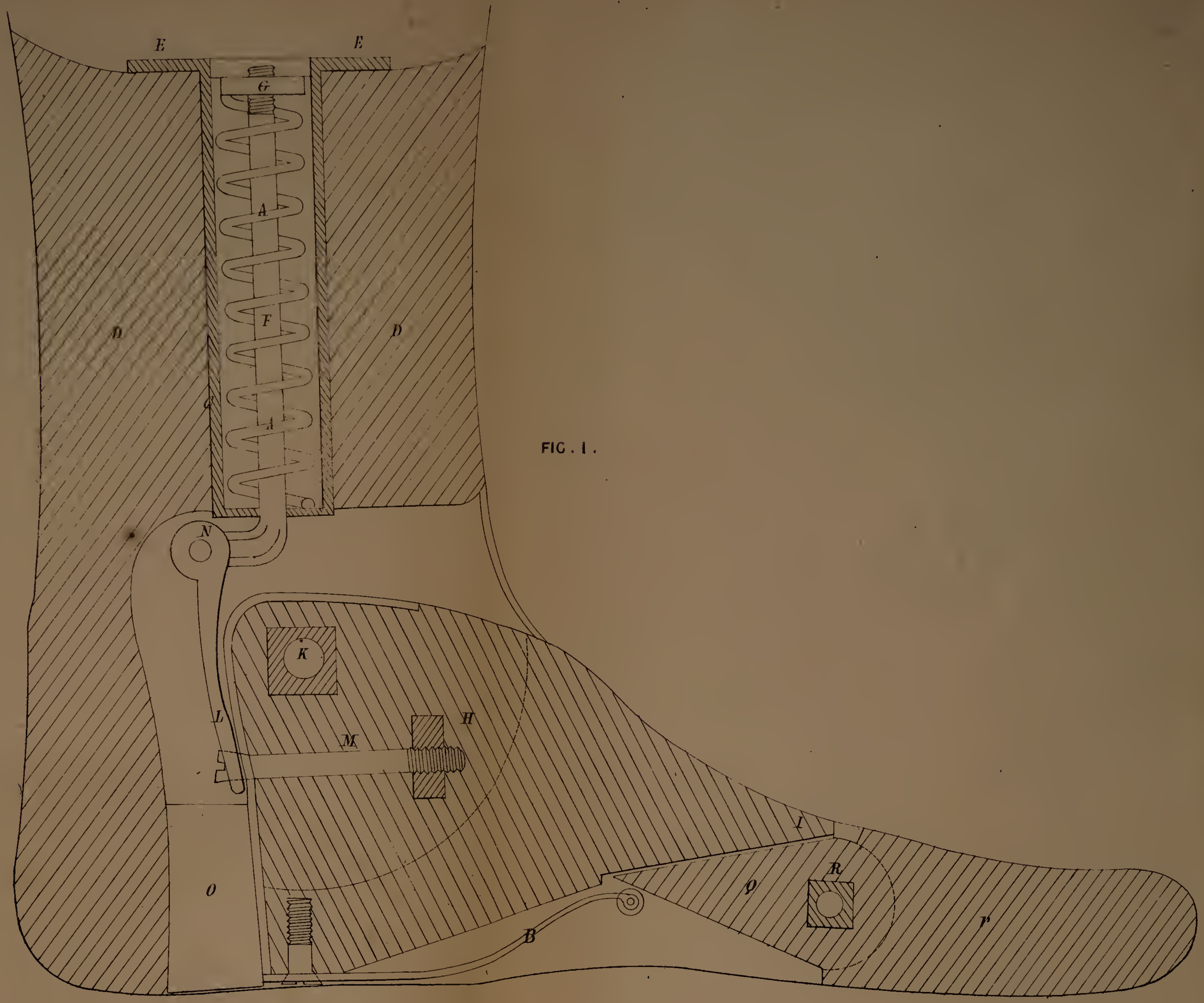

FIG. 1.

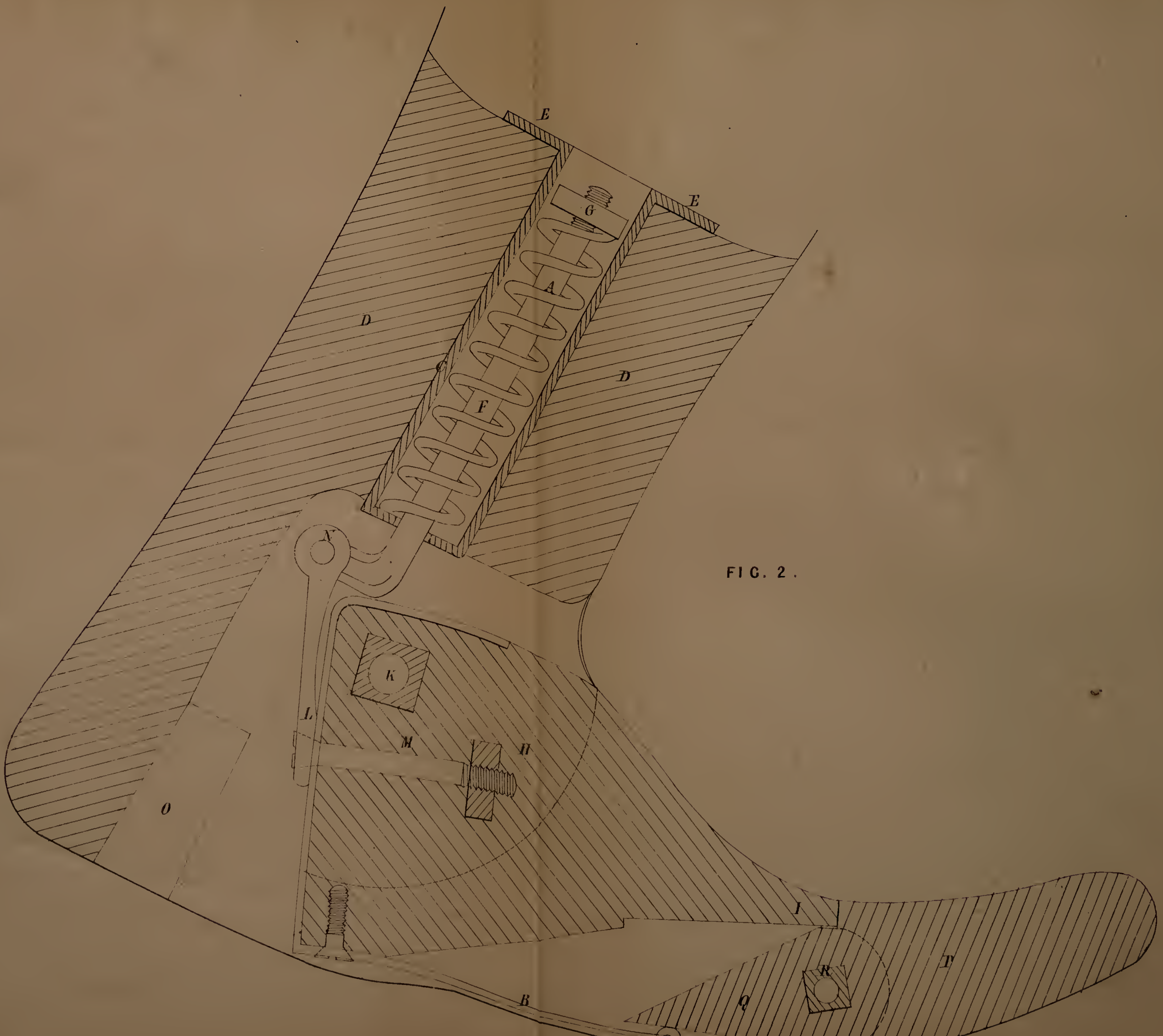

FIG. 2.

Drawn on Stone by Malby & Sons

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